

ORDNANCE CORPS
PICATINNY ARSENAL
DOVER, NEW JERSEY

Mr. GKaye/lev/5138

17 FEB 1959

IN REPLY
REFER TO:

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FELTMAN RESEARCH AND ENGINEERING LABORATORIES
ORDBB- TWL 0565

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ATTENTION:



SUBJECT: T- Timer (U)

Gentlemen:

(S) It is understood that Radiation Research Corporation has designed a krypton nuclear battery which can be utilized to power the subject timer. In this regard, these Laboratories have obtained an informal quotation from Radiation Research Corporation which indicates that all the necessary electronic components, based upon existing technology, can be provided to assemble six (6) workable timers within a period of nine (9) months. Radiation Research Corporation's estimated cost (informal estimate) for the fabrication, testing, and calibration of the electronic components required, exclusive of the nuclear batteries, is \$25,000.

(U) These Laboratories have prepared and provided the inclosed Scope of Work to Radiation Research Corporation for a formal bid to provide six (6) of the subject timers in conjunction with these Laboratories.

(U) This letter is intended to supply preliminary planning information for funding this project. It is anticipated that an official bid will be received by these Laboratories within the next month. If your Company wishes to incorporate the available krypton batteries into the timer at that time, funding can be based upon an official bid, a copy of which will be sent to your office.

FOR THE COMMANDER:

Very truly yours,

Leo Horowitz

1 Incl

1. cc Scope of Work for Consultation, and Component Fabrication in Connection with the Design and Development of Timer, Nuclear, Delay, T- , with Appendix A & B (S)



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Communications for the Project Officer shall be addressed to the Commanding Officer, Picatinny Arsenal, Dover, New Jersey, Attention: Advanced Atomic Weapons Laboratory, ORDBB-TW1. Communications for the Contracting Officer shall be addressed to the New York Ordnance District.

3. SECURITY

The highest classification for work on this contract is SECRET. Signed Security Agreement DD Form 441 is a prerequisite to award of a contract.

4. Procedure

To attain the objective, the Contractor shall perform the followings:

- a. Provide the Project Officer with consultation services in connection with the design and development of electronic components intended for the timer to the extent of approximately fifty (50) man-hours per month.
- b. Provide a timer electronic circuit design which incorporates electronic and electro-mechanical component designs which can be fabricated or obtained commercially from existing technology.
- c. Fabricate or obtain commercially and calibrate all the electronic components required for six (6) each electronic time pulsing units. The electronic components shall include but not be limited to the following: voltage regulator, current regulator, capacitor, firing diode, and hermetically sealable housing for the electronic components. The design of the electronic components shall satisfy the requirements set forth in Appendix A as close as is possible. Variations from the design requirements may be obtained by written approval from the Project Officer for the purpose of permitting the use of available component designs should this be necessary. A power supply for this timer will be provided by the Project Officer. The power supply, consisting of batteries, is to be incorporated into the electronic time pulsing unit.
- d. Assemble six (6) each electronic time pulsing units into a hermetically sealed unit compatible with the complete timer housing.
- e. The Contractor shall perform laboratory tests deemed necessary by the Contractor and Project Officer to calibrate the electronic time pulsing unit prior to release for use in the intended timer.
- f. Upon completion of the work referred to in the above paragraph 4 of this Article I, furnish to the Project Officer:
 - (1) A complete set of reproducible detail drawings of the electronic components. For commercially obtained components where detailed drawings may be unobtainable, contour drawings and complete specifications shall be provided. The drawings and that which is shown thereon, disclosing information originated at Government expense during the performance of this contract, shall become the property of the Government.
 - (2) Specifications that will insure procurement of satisfactory components. The specifications shall cover components, assemblies, and such materials as are not covered by existing Government specifications.

(3) Description of unique methods of fabrication and assembly, incorporating sufficient details to permit reproducible fabrication of the selected design.

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5. DESIGN APPROVAL

Approval of the Project Officer is required prior to assembly of the items specified in paragraph 4d. No approval is required for fabrication of models, specimens, or test fixtures to investigate principles of operation or to obtain design information or data required prior to or during development of the item.

6. REPORTS

a. Quarterly Progress Reports

During the period of performance of this contract, the Contractor shall submit quarterly one (1) copy of the Progress Report to this Arsenal, Attention: ORDBB-PBI for approval. This report shall be delivered so as to arrive at the specified destination on or before the 10th day of the month succeeding that covered by the report. Upon approval, the report shall be distributed as indicated in Appendix B. This report shall contain:

(1) A brief statement of work accomplished to start of current report period.

(2) A description of the work performed during the current report period including all work whether yielding positive or negative results. Design discussion, results of tests both in raw and summary form and their interpretation, and plans and schedules of work contemplated for the ensuing quarters shall be included. Sufficient description of experimental or test conditions shall be provided to establish validity of interpretation beyond reasonable doubt.

(3) All pertinent sketches or drawings.

(4) All pertinent calculations and theoretical analyses.

(5) A statement of the number of man-hours expended for (1) engineering, (2) drafting, (3) fabrication, and (4) other functions in accomplishing the work performed during the report period.

(6) Any other information such as schedule changes, procurement difficulties, etc, that will assist the Project Officer in evaluating progress by the Contractor.

b. Monthly Fund Report

In addition to the Quarterly Progress Report, the Contractor shall submit to this Arsenal, Attention: ORDBB-PBI, a monthly report indicating the general status of funds assigned to the project. This report shall be delivered so as to arrive at the specified destination on or before the 10th day of the month succeeding that covered by the report. The report shall be distributed as indicated in Appendix B and shall contain the following information:

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- (1) Total amount authorized
- (2) Total amount committed as of the end of the previous reporting period. ("Amount committed" is interpreted as the total amount actually expended plus any amount obligated, including any obligations that would have to be paid if the contract were terminated before the designated completion date. This would include obligations for special materials or supplies ordered solely for use under the contract and which could not be used for some other purpose. This would also possibly include obligations for salaries of consultants whose services are required only in the performance of the contract.)
- (3) Approximate total amount committed during the current reporting period.
- (4) Approximate total amount committed as of the end of the current reporting period.
- (5) Approximate uncommitted balance as of the end of the current reporting period.
- (6) Approximate total amount actually expended during the reporting period.
- (7) Estimate of amount to be expended in the next period.
- (8) Total amount of payments received as of the end of the current reporting period.

e. Summary Report

Prior to completion or termination of the contract, the Contractor shall submit a Summary Report, in narrative form, containing the technical findings, conclusions and recommendations made in connection with the work. The Summary Report shall also include design principles, procedures, and methods of calculation that would be generally applicable to Ordnance Corps developments. The Contractor shall submit one (1) copy of this report to this Arsenal, Attention: ORIEB-PRI, for approval, postmarked within thirty (30) days following completion or termination of the contract. Upon approval, the report shall be distributed as indicated in Appendix B.

7. IDENTIFICATION OF CORRESPONDENCE, DESIGNS, ETC

a. All correspondence, reports, drawings, or other pertinent papers in connection with this contract are to bear the following references:

- (1) Contract No.:
- (2) Ord Corp Project No.: TN2-8085
- (3) DA Project No.:

8. CONSIGNMENT AND/OR DELIVERY OF SHIPMENTS

a. Instructions for the delivery of items under this contract will be issued by the Project Officer through the Contracting Officer.

b. Express and mail shipments to Picatinny Arsenal shall be prepaid and shall be consigned to "The Transportation Officer, Picatinny Arsenal, Dover, New Jersey." All shipping papers and exterior wrappers or containers shall be marked "Per Commanding Officer, Attention: Samuel Feltman Ammunition Laboratories, ORDN-TM1, Project TNS-8065, Contract _____."

c. Freight shipments to Picatinny Arsenal shall be made f.o.b., Picatinny Arsenal, and shall be consigned to "The Transportation Officer, Picatinny Arsenal, Picatinny, New Jersey, c/o Wharton and Northern Railroad, Last Carrier."

9. GOVERNMENT-FURNISHED PROPERTY

In the performance of this contract, the Contractor may be furnished at the discretion of the Contracting Officer, such Government-owned material available in Government stocks as will enable the Contractor to achieve the objective of the contract more efficiently.

10. PACKAGING

a. All component parts furnished by the Contractor shall be packaged for shipment in accordance with the best commercial practices so as to be acceptable to common carriers for safe transportation at the lowest rates. Packaging of radioactively loaded items will comply with I.C.C. Regulations and appropriate statutes covering such shipments.

b. Packaging to full Ordnance standards is not mandatory for shipments of experimental items between Contractor's plant and test facilities.

11. INSPECTION

Inspection of the component parts will be made as specified by the Project Officer.

12. TESTING AND TESTING FACILITIES

a. Development Testing

When necessary, the Contractor shall have at his disposal, at the discretion of the Project Officer and at no cost to the Contractor, test facilities available at Picatinny Arsenal and/or other Government agencies.

b. Acceptance Testing

Final engineering evaluation tests will be performed under the direction of the Project Officer.

13. TARGET DATES

The following target dates, in months after effective date of contract, have been tentatively established. While the Contractor should apply an average rate of effort of two hundred and twenty-five (225) man-hours per month to meet this schedule, because of the research and development nature of the work involved, deviations may be necessary.

TARGET DATES

	<u>Months After Contract is Placed</u>
a. Provide an acceptable electronic circuit design	1
b. Fabricate or obtain commercially and calibrate all electronic components required for 6 each electronic time pulsing units	5
c. Assemble 6 each electronic time pulsing units	6
d. Conduct tests with the 6 each electronic time pulsing units to assure compatibility of these units with the technical requirements and the complete timer assembly	8
e. Complete all work specified in paragraph 4f	9

APPENDIX A

REQUIREMENTS

1. PROVISIONS APPLICABLE TO REQUIREMENTS

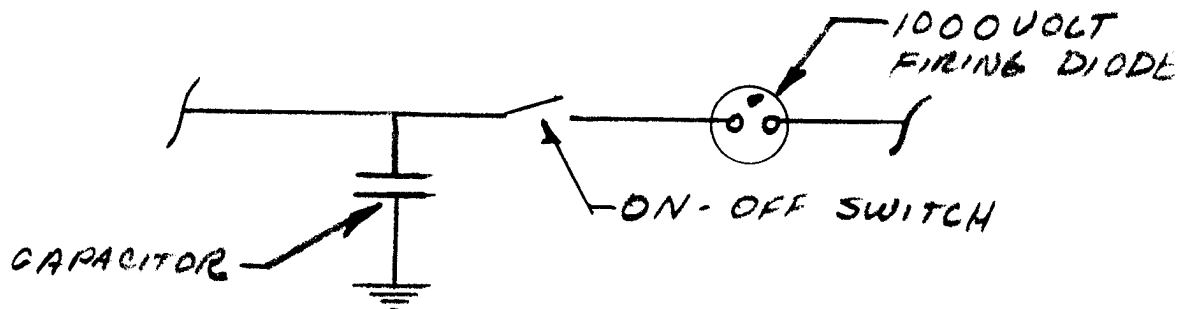
a. This Appendix incorporates the requirements to be used as the basis for the design and development of components for a firing device.

b. Any or all of the requirements are subject to change or elimination during the course of performance under the contract by reason of revised military requirements, simplifications of design, availability of materials, increased efficiency of functioning, or for any other appropriate reason.

c. Changes, additions or eliminations of requirements shall be effected only by execution of Change Orders or Supplemental Agreements to the contract.

2. REQUIREMENTS

a. The timer shall be capable of being externally started, stopped, and be resettable an indefinite number of times. An on-off switch shall be connected in the timer circuit as schematically indicated below.



The purpose of this arrangement is to provide a visual indication that the timer is operative. This, of course, would only be applicable after sufficient time (presently intended as a one day period) has been allowed for the timer to accumulate sufficient charge to function the counter coil.

b. The timer shall have all manually operated controls at the front in order to permit all necessary operations therefrom.

c. The timer shall be capable of being set to a minimum time delay of one (1) day, and be settable in one (1) day increments from one (1) day to three hundred and sixty-five (365) days.

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- d. A positive safety shall be provided to prevent the timer from functioning for a time delay of less than one (1) day or accidentally fired on setting.
- e. A visual indication shall be provided to indicate the set time and the time delay remaining when the timer is running.
- f. The timer shall provide an electrical output to an external terminal capable of initiating a 20,000 erg initiator after runout of the set delay time. In addition, an electrical output to an external terminal shall be provided, to provide output energy at each timer count equal in magnitude of at least 5% of the energy supplied to the counter coil mechanism.
- g. The timer shall function with a 90% probability of proper operation, with a 90% confidence level, in any orientation of the timer and between and including the temperature limits of 0°F to 110°F .
- h. Timing accuracy, i.e., range of extreme timing errors, is desired to be within $\pm 2\%$ and is required to be within $\pm 5\%$.
- i. Timer shall be operable and watertight under a pressure of 30 ft of water.
- j. Timer shall have a shelf life of five (5) years under the environmental conditions specified herein. A ten (10) year shelf life is desired but is not a requirement.
- k. The desired overall dimensions shall be 3" x 3" x 6" maximum.
- l. The timer shall be capable of being consumed by fire and shattered by an explosive force.
- m. The timer shall withstand the transportation vibration test as specified in MIL-STD-303 without detrimental effect to functioning capabilities.
- n. Timer shall withstand 5 ft drop test when dropped on a steel plate (207 Brinell minimum hardness) having a minimum thickness of three (3) inches and solidly supported on a reinforced concrete base.
- o. The timer shall be incapable of being detected by noise detecting devices.

APPENDIX B

REPORT DISTRIBUTION

Distribution of reports will be as follows:

	<u>Quarterly Progress Report</u>	<u>Monthly Fund Report</u>	<u>Summary Report</u>
Commanding Officer Picatinny Arsenal Dover, New Jersey ATTN: ORHBB-PH1	2	2	5
Chief of Ordnance Dept of the Army Washington 25, D. C. ATTN: ORDTN	1		1
<div data-bbox="235 1155 816 1390"></div>	2		2

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